

Notice of Allowability

Application No.

10/804,279

Examiner

Jerry Martin Blevins

Applicant(s)

WILSON LIN ET AL.

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 11/14/2005.
2. ☒ The allowed claim(s) is/are 1-24.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


Brian Healy
Primary Examiner

DETAILED ACTION

Response to Arguments

Applicant's arguments, see pages 10-17, filed 11/14/2005, with respect to claims 1-24 have been fully considered and are persuasive. The rejection of claims 1-24 and the objection of claims 9-11 and 18 have been withdrawn.

Allowable Subject Matter

Claims 1-24 are allowed.

The following is an examiner's statement of reasons for allowance:

Regarding claim 1, the prior art, as best exemplified by US Pre Grant Publication to Cai, number 2002/0094168, teaches a device (Figure 1, element 100) comprising a fiber (elements 110,120) having a side surface formed on fiber cladding where an evanescent field of guided light in the fiber exists (paragraph 8, page 1 and paragraph 16, page 2) and a whispering gallery mode cavity (element 101 and paragraph 8, page 1) formed on the side surface to support one or more whispering gallery modes and configured to evanescently extract energy in light guided in the fiber into a whispering gallery mode. However, Cai, neither alone nor in combination with the prior art of record, neither discloses nor renders obvious that the whispering gallery mode cavity is planar and comprises a top cladding ring, a cavity ring, and a bottom cladding ring having a planar coupling surface, the bottom cladding ring coupled to the evanescent field of guided light.

Claims 2-11 are allowed based on their dependence from allowed base claim 1.

Regarding claim 12, the prior art, as best exemplified by US Patent to Tapalian, number 6,657,731, teaches a device (Figure 1B) comprising an optical waveguide (element 110) having a side surface where an evanescent field of guided light in the waveguide is present (column 2, lines 32-41) and a whispering gallery mode cavity (102) formed on the side surface to support one or more whispering gallery modes and configured to evanescently extract energy in light guided in the waveguide into a whispering gallery mode (column 2, lines 32-41). However, Tapalian, neither alone nor in combination with the prior art of record, neither discloses nor renders obvious that the whispering gallery mode cavity is planar and comprises a top cladding ring, a cavity ring, and a bottom cladding ring having a planar coupling surface, the bottom cladding ring coupled to the evanescent field of guided light.

Claims 13-18 are allowed based on their dependence from allowed base claim 12.

Regarding claim 19, Tapalian teaches a pair of whispering gallery mode cavities optically coupled to each other and optically coupled to a waveguide. (Figure 5 shows two cavities, on the same side of a division, which are in close proximity so as to be optically coupled.) Tapalian also teaches a sensing unit to measure a parameter in reflected light from the pair of cavities to measure an environmental effect affecting the optical coupling of the pair of cavities. Tapalian does not teach a fiber having a portion of the cladding and a portion of the underlying core removed to form a flat surface. However, US Patent to Dyott, number 6,718, 097, teaches a fiber having a portion of

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cladding and a portion of the underlying core removed to form a flat surface (column 3, lines 29-52 and Figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Tapalian with the fiber having a portion of cladding and a portion of the underlying core removed to form a flat surface, of Dyott. The motivation would have been to improve coupling between the fiber and cavities.

However, Tapalian, neither alone nor in combination with the prior art of record, neither discloses nor renders obvious that the whispering gallery mode cavity is planar and comprises a planar cavity ring surrounded on both sides by planar cladding rings, at least one of the cladding rings has a planar surface and is coupled to the side surface.

Regarding claim 20, Tapalian teaches a pair of whispering gallery mode cavities optically coupled to each other and optically coupled to a waveguide. (Figure 5 shows two cavities, on the same side of a division, which are in close proximity so as to be optically coupled.) Tapalian also teaches a sensing unit to measure a parameter in reflected light from the pair of cavities to measure an environmental effect affecting the optical coupling of the pair of cavities. Tapalian does not teach a fiber having a portion of the cladding and a portion of the underlying core removed to form a flat surface. However, Dyott teaches a fiber having a portion of cladding and a portion of the underlying core removed to form a flat surface (column 3, lines 29-52 and Figure 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Tapalian with the fiber having a portion of cladding and a portion of the underlying core removed to form a flat surface, of Dyott. The motivation would have been to improve coupling between the fiber and cavities. However, Tapalian, neither

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alone nor in combination with the prior art of record, neither discloses nor renders obvious a housing unit comprising a chamber to hold a section of the fiber that has the flat surface and the pair of whispering gallery mode cavities, and a moveable diaphragm in the chamber to transmit pressure to the pair of whispering gallery mode cavities in response to a pressure applied to the diaphragm.

Regarding claim 21, Cai teaches a method of providing a fiber (elements 110,120) having a side surface formed on fiber cladding where an evanescent field of guided light in the fiber exists (paragraph 8, page 1 and paragraph 16, page 2) and at least one whispering gallery mode cavity (element 101 and paragraph 8, page 1) that is in evanescent coupling with the fiber through the side surface. Cai does not teach the provision of a sensor in the fiber. Cai also does not teach the steps of exposing the sensor to an external medium to cause a change in the at least one whispering gallery mode cavity, monitoring the change in guided light caused by the at least one whispering gallery mode cavity, and extracting information about the external medium based on the change. Tapalian teaches the provision of a sensor (column 7, line 21). Tapalian also teaches the steps of exposing the sensor to an external medium to cause a change in the at least one whispering gallery mode cavity (column 2, lines 42-54), monitoring the change in guided light caused by the at least one whispering gallery mode cavity (column 2, lines 51-54), and extracting information about the external medium based on the change (column 2, lines 51-54). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the sensor and the further limiting steps, as taught by Tapalian, into the method of Cai. The motivation

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would have been to give the method greater industrial and military applicability (Tapalian, column 7 lines 32-36). However, Cai, neither alone nor in combination with the prior art of record, neither discloses nor renders obvious that the whispering gallery mode cavity is planar and comprises a planar cavity ring surrounded on both sides by planar cladding rings, at least one of the cladding rings has a planar surface and is coupled to the side surface.

Claims 22-24 are allowed based on their dependence from allowed base claim 21.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry Martin Blevins whose telephone number is 571-272-8581. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMB



Brian Healy
Primary Examiner